openreach

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Suppliers' Information Note
For The Openreach Network

OPENREACH WHOLESALE EXTENSION SERVICES 10000 (WES 10000) AND WHOLESALE END TO END EXTENSION SERVICES (WEES 10000)

Service Description

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1. Introduction

This Suppliers' Information Note (SIN) describes the Openreach Wholesale Extension Services 10000 (WES10000) and Wholesale End to End Extension Services (WEES 10000). The SIN provides information about the service for use by Customer Premises Equipment (CPE) manufacturers and developers.

Note: Openreach has provided formal notification that WES 10000 and WEES 10000 will no longer be available for new supply with effect from 30 September 2016. External shifts (re-sites and re-arranges) will also not be available from that date.

2. Service Outline

The WES/WEES 10000 service operates at a speed of 10.3125 Gbit/s for 10GBase-LR (10 Gigabit Ethernet LAN PHY), and 9.95328 Gbit/s for both STM-64 (10 Gigabit SDH) and 10GBase-LW (10 Gigabit Ethernet WAN PHY).

The WES/WEES 10000 service can be used as an STM-64 SDH transport service or used to interconnect Local Area Networks incorporating a 10 Gigabit Ethernet backbone.

The WES/WEES 10000 service is an unprotected service. However if protection against both network fibre breaks and card failures is sought, 2 WES/WEES 10000 services may be used. The use of 2 WES/WEES 10000 circuits to provide additional resilience will result in 2 customer interfaces being presented at each site.

A typical WES 10000 service is shown in **Error! Reference source not found.**.

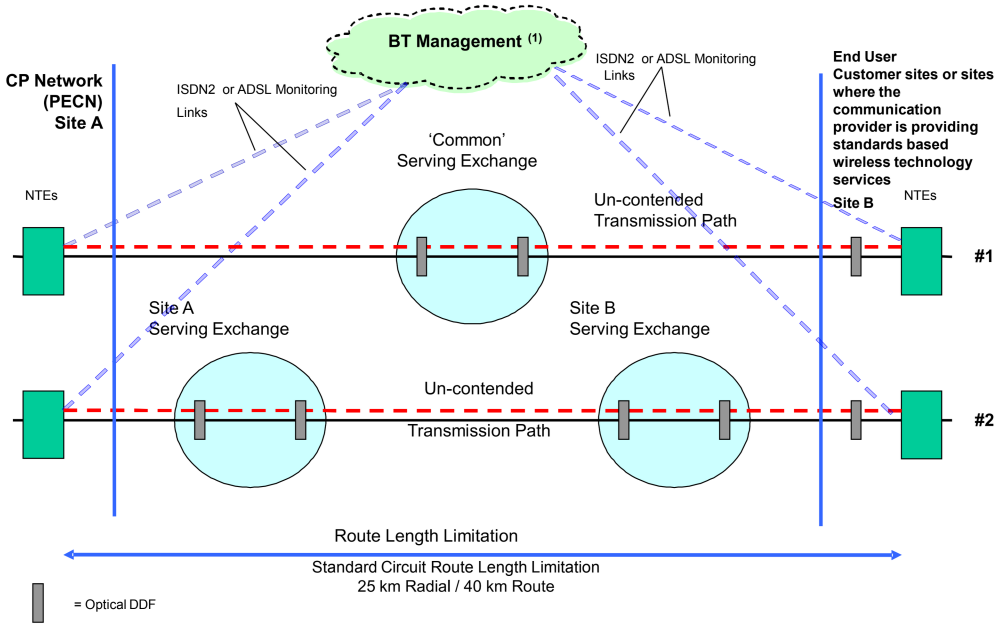
BT Management (1)
CP Network (PECN) Site A
ISDN2 or ADSL Monitoring Links
ISDN2 or ADSL Monitoring Links
End User Customer sites or sites where the communication provider is providing standards based wireless technology services
'Common' Serving Exchange
NTEs
Un-contended Transmission Path
Site B
NTEs
#1
Site A Serving Exchange
Site B Serving Exchange
Un-contended Transmission Path
#2
Route Length Limitation
Standard Circuit Route Length Limitation
25 km Radial / 40 km Route
= Optical DDF

Figure 1. Typical WES 10000 configuration

A typical WEES 1000 service is shown in **Error! Reference source not found.**.

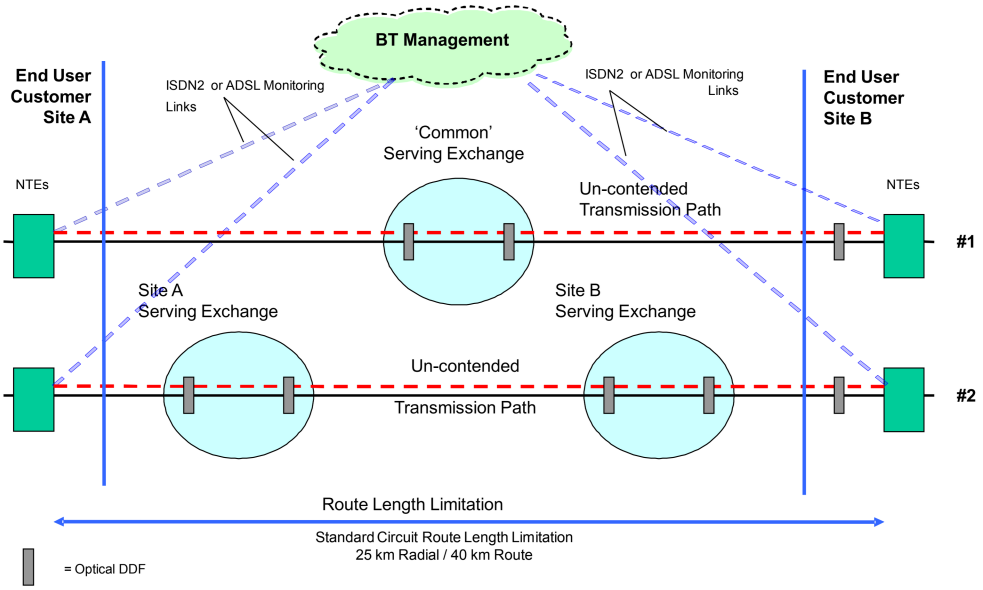

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Figure 2. Typical WEES 10000 configuration

3. Technical Specification

The WES/WEES 10000 NTE support the following types of customer interface:

1. 10.3125 Gbit/s 10 Gigabit Ethernet LAN PHY
   10GBase-LR optical presentation with IEEE 802.3 [Error! Reference source not found.] 10 Gigabit Ethernet framing.
2. 9.95328 Gbit/s 10 Gigabit Ethernet WAN PHY
   10GBase-LW optical presentation with IEEE 802.3 [Error! Reference source not found.] 10 Gigabit Ethernet framing.
3. 9.95328 Gbit/s STM-64 SDH
   S64.1 optical presentation conforming to ITU-T Recommendation G.691 [Error! Reference source not found.] and G.707 [Error! Reference source not found.]

The WES/WEES 10000 NTE does not support conversion between the three interface types listed above. The same customer interface type must be presented at each end of a WES/WEES 10000 link.

3.1 10Gig Ethernet LAN PHY and WAN PHY

3.1.1 General

10 Gigabit Ethernet conforms to the IEEE 802.3ae [Error! Reference source not found.] standard.

The interface is the Network Termination Point (NTP), i.e. the point of connection between the Openreach Network Terminating Equipment (NTE) and the CPE interface. The Customer Interface consists of a pair of SC/PC type fibre interface ports (transmit and receive). The customer provides the fibre patch connectors between the NTE and CPE; the maximum fibre length is shown in **Error! Reference source not found.**.

The 10GBase-LR and 10GBase-LW type interface is as specified in the 10 Gigabit Ethernet IEEE 802.3ae [Error! Reference source not found.] specifications. Attention is drawn to the Intellectual Property Rights (IPRs) set out in the preface of this agreed International standard. It is the responsibility of the CPE supplier to ensure that they have the necessary rights from the owner of the IPR. The IPR owner has stated that they are willing to negotiate licences under reasonable and non-discriminatory terms and conditions with applicants throughout the world.

Protocol	10 Gigabit Ethernet IEEE 802.3ae [Error! Reference source not found.]
Line Rate	10.3125 Gbit/s for 10GBase-LR (LAN PHY) and 9.95328 Gbit/s for 10GBase-LW (WAN PHY)

Maximum Bit Error Rate	10^{-12}
Power Requirement	See Section 4.2
Customer Fibre Connector	SC/PC type
Customer interface Fibre *(Customer provided)*	Single-mode 1310nm, 9/125 micron
Customer interface Fibre Maximum Delivery Distance	10km from NTE's 10GBase-LW or 10GBase-LR port
Operating Temperature	5° to 40° C
Laser Safety	Class 1 under all conditions as per IEC 825-1 [Error! Reference source not found.]

Table 1. 10 Gigabit Ethernet LAN and WAN PHY NTE technical specification

3.1.2 Network Fibre Break

In the event that there is a network fibre break, the customer interface will shut down if it is operating with customer equipment using a 10GBase-LR interface. This will be seen on customer equipment as a LOS (Loss of Signal) condition.

Customer equipment using a 10GBase-LW interface will see MS-AIS generated at each end of a WES/WEES10000 link in the event of a network fibre break, in accordance with IEEE 802.3ae [Error! Reference source not found.]. The fault propagation behaviour of the NTE customer port operating in 10GBase-LW mode may be changed from generation of MS-AIS to generation of LOS (Loss of Signal) by special request.

3.1.3 Frame Size

The minimum and maximum Ethernet frame size supported by the WES/WEES 10000 service is determined by the customer's equipment not the WES/WEES 10000 NTEs. The WES/WEES 10000 service can support any frame size supported by the customer's equipment.

3.1.4 Transparency

Customer equipment using 10GBase-LR interface must have a valid PCS (Physical Coding Sublayer) according to IEEE 802.3 (2005). However at the MAC (Ethernet Frame) layer, the NTEs are transparent.

3.2 STM-64 10 Gigabit SDH

3.2.1 General

The STM-64 interface conforms to ITU-T Recommendation G.707 [Error! Reference source not found.] and G.691 [Error! Reference source not found.].

The interface is the Network Termination Point (NTP), i.e. the point of connection between the BT Network Terminating Equipment (NTE) and the CPE interface. The Customer Interface consists of a pair of SC/PC type fibre interface ports (transmit and receive). The customer provides the fibre patch connectors between the NTE and CPE; the maximum fibre length is shown in **Error! Reference source not found.**.

The STM-64 S64.1 interface is as specified in ITU-T G.691 [Error! Reference source not found.] recommendations. Attention is drawn to the Intellectual Property Rights (IPRs) set out in the preface of this agreed International standard. It is the responsibility of the CPE supplier to ensure that they have the necessary rights from the owner of the IPR. The IPR owner has stated that they are willing to negotiate licences under reasonable and non-discriminatory terms and conditions with applicants throughout the world.

Protocol	G.707 STM-64 according to ITU-T G.707
Line Rate	9.95328 Gbit/s
Maximum Bit Error Rate	10^{-12}
Power Requirement	See Section 4.2
Customer Fibre Connector	SC/PC type
Customer interface Fibre ***(Customer provided)***	Single-mode 1310nm, 9/125 micron
Customer interface Fibre Maximum Delivery Distance	10km from NTE's customer port.
Operating Temperature	5° to 40° C
Laser Safety	Class 1 under all conditions as per IEC 825-1 [Error! Reference source not found.]

Table 2. STM-64 customer interface NTE technical specification

3.2.2 Network Fibre Break

Customer equipment using an STM-64 interface will see MS-AIS generated at each end of a link in the event of a network fibre break, in accordance with ITU-T G.707 [Error! Reference source not found.].

The fault propagation behaviour of the NTE customer port operating in STM-64 mode may be changed from generation of MS-AIS to generation of LOS (Loss of Signal) by special request. The generation of the LOS condition is achieved by shutting down the customer port on the NTE.

3.2.3 Transparency

The WES/WEES 10000 service is a physical layer transport with a high level of transparency. Where compatibility issues are encountered that result in the B1 byte being incorrectly reported, a completely transparent option can be enabled on the interface. The only requirement of the interface operating in transparent mode is that the customer signal operates at 9.95328 Gbit/s.

This mode of operation will not generate MS-AIS in the event of a network fibre break (but instead shutdown the customer port). In either transparent or standard mode, the customer signal is transported transparently by the NTE.

4. Physical Arrangements

4.1 Physical Location of Connectors

The User–Network Interface (UNI) is located at the connector on the Openreach Network Terminating Equipment (NTE) with a connector on the Customer side as described in the relevant part of Section 3 of this document.

4.2 NTE Power Supply Requirements

4.2.1 General

By placing a order with Openreach the customer has accepted the conditions placed by Openreach. In relation to powering of equipment, the customer must comply with the requirements of BS7671 and the details giving within the 'DC Power Planning and Installation Guide for WES-BES Products' document.

The Openreach NTE is locally powered and offers AC or DC power options. The CP will be required to provide either a local 50Hz AC supply in the form of standard 13 Amp power socket(s); or dual -50V DC power distributions and Earth connections, with all wiring colour schemes conforming to BS7671 (IEEE Wiring Regulations). It will be the customers' responsibility to ensure that the power supply is fused and safe for Openreach to use. These should be in close proximity to the NTE installation location.

4.2.2 Installation and Testing

In addition to the NTE and Chassis powering requirements below, a spare 50Hz AC mains supply 13A socket should also be provided in close proximity to the NTEs, to power Openreach test equipment during both initial commissioning and subsequent maintenance support activities.

4.2.3 AC Power Connection

AC power connection between Openreach equipment and the power socket will be made using a standard IEC320 C13-14 power lead fitted with a standard 13A plug. The NTE itself has dual power supply units internally and requires two AC mains supply sockets. This will require two mains connection for each NTE provided. The consumption of the Openreach NTE and power unit chassis in this service will be no more than 150 Watts per NTE

4.2.4 DC Power Connection

The DC In-Line (Molex) connector is specified as the standard method of connecting DC power by Openreach, and represents the "Demarcation Point" between Openreach and the customer. At their site, the customer is required to provide suitable power and earth connection to, and be responsible for the supply, wiring and labelling to the demarcation point. Openreach will not supply or install the DC distribution system as part of the standard Ethernet installation.

- **Customer provided wiring up to the Openreach specified In-Line connector.**

  Wiring, MCB isolation or fuse (i.e. C Type MCB or Cartage Fuse), must be provided by the customer, up to and including the DC in-line connector, as per BT's requirements stated within the 'DC Power Planning and Installation Guide for WES-BES Products' document with respect to;

(i) Correctly rated MCB/Fuse, refer to the WES/WEES product handbook for correct rating

(ii) Correct labelling of wiring and MCB/fuse positions compliant with BS 7671,

(iii) Correct size of cable for required voltage drop at required maximum current,

(iv) Separately fused isolatable A & B power supplies, as detailed in the 'DC Power Planning and Installation Guide for WES-BES Products' document.

The in-line connector has a maximum current handling capability of 11A, and is not to be used for equipment requiring greater than a 11A supply (such as the Nortel Optera 5200 equipment, which require 20A feeds).

4.2.5 Additional Details

For further details on the provision of DC Power, see the 'DC Power Planning and Installation Guide for WES-BES Products' available on the Openreach Ethernet website.

If there is a conflict between DC power information contained in the 'DC Power Planning and Installation Guide for WES-BES Products' and the SIN document, the order of precedence shall be as follows:

(a) DC Power Planning and Installation Guide for WES-BES Products

(b) SIN

5. Service Availability and Tariffs

For further information on service availability and tariffs please contact your Openreach Sales & relationship Manager, or see http://www.openreach.co.uk/orpg/products/wes/eoiwes.do.

6. References

[1]	IEEE 802.3, Standards for Local Area Networks: CSMA/CD Access Method
[2]	IEC 825-1, International Electrotechnical Commission (IEC) Standard – Safety of Laser products Part 1
[3]	BTNR 2511 - Interface of telecomms equipment with a nominal 48v negative dc power supply
[4]	IEEE 802.3ae, IEEE standards for 10 Gigabit Ethernet in the LAN/WAN, 2002
[5]	ITU-T Recommendation G.691 Optical interfaces for single channel STM-64, STM-256 and other SDH systems with optical interfaces
[6]	ITU-T Recommendation G.707 Network node interface for the synchronous digital hierarchy (SDH)

For further information or copies of referenced sources, please see document sources at
https://www.openreach.co.uk/orpg/home/helpandsupport/sins/sins.do

7. Abbreviations

BT	British Telecommunications plc
CPE	Customers' Premises Equipment
CSMA	Carrier Sense Multiple Access
IEC	International Electrotechnical Commission
IEEE	Institute of Electronic and Electrical Engineers [USA]
IPR	Intellectual Property Right
LAN	Local Area Network
LOS	Loss of Signal
MCB	Mini Circuit Breaker
MS-AIS	Multiplex Section – Alarm Indication Signal
NTE	Network Termination Equipment
NTP	Network Terminating Point
SC/PC	Subscription Channel / Physical Contact
PHY	Physical Layer Device
SDH	Synchronous Digital Hierarchy
STM	Synchronous Transport /Transfer Mode
SIN	Suppliers' Information Note [BT]
UNI	User-to-Network Interface
WAN	Wide Area Network

8. History

Issue	Date	Revision changes
Issue 1.0	29 Sept 2006	First issue.
Issue 1.1	7 Mar 2007	Contact details in "Service Availability and Tariffs" clause updated.
Issue 1.2	30 Oct 2007	Service description amended in accordance with updated DC power guidance
Issue 1.3	25 June 2009	NTE's AC power requirements updated and section on Transparency added. Also editorial changes, including updated references.

Issue 1.4	9 December 2013	Figure 1 and 2 have been changed to reflect that management is present at both ends of the circuit and that the management can be ADSL or ISDN2
Issue 1.5	January 2015	Change SINet site references from http://www.sinet.bt.com to http://www.btplc.com/sinet/
Issue 1.6	June 2016	Addition of notice to advise that WES 10000 and WEES 10000 will no longer be available for new supply with effect from 30 September 2016
Issue 1.7	August 2020	Changes to branding, from BT to Openreach including changes to reflect new Openreach SIN site and Openreach SIN email address
Issue 1.7	July 2021	Annual Review – no changes required – issue remains unchanged.
Issue 1.7	July 2022	Annual Review – no changes required – issue remains unchanged.
Issue 1.7	July 2023	Annual Review – no changes required – issue remains unchanged.
Issue 1.7	July 2024	Annual Review – no changes required – issue remains unchanged.

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